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(54) PESTICIDAL SHEETS OR CONTAINERS  
(71) BRUCE JON MORRISON  
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(72) LAWRENCE JOHN PARRY AND BRUCE JON MORRISON  
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(57) Claim

1. A method of proofing an item against crawling insects, the method including the steps of:

dispersing a pesticide in a solvent, said solvent comprising a water- or alcohol-based printer's ink or ink/solvent mixture, and said pesticide comprising a wettable powder or liquid pesticide dispersible in the solvent;

applying the pesticide dispersion to the surface of the item by a printing method; and

drying the dispersion to remove the volatile solvent constituents and to leave the pesticide on the item to be contacted by the crawling insects.

4. A method as claimed in any of the preceding claims, in which the pesticide is one or more carbamate, chlorinated hydrocarbon, organic phosphate, or natural or synthetic pyrethroid.

5. A method as claimed in Claim 4, in which the pesticide is one or more of bendicarb, idenophos and fenitrochior.

Title: "PESTICIDAL SHEETS OR CONTAINERS"

BACKGROUND OF THE INVENTION

(1) Field of the Invention

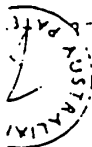
THIS INVENTION relates to pesticidal sheets,  
5 containers or the like, and to methods of manufacturing same.

(2) Description of Prior Art

There are two main methods for applying pesti-  
cidal protection to a surface or area. The first method  
10 is to apply the pesticide to the surface by mixing it  
with a liquid carrier, spraying the mixture onto the  
surface, and allowing the liquid carrier to evaporate,  
leaving the pesticide as a residue. The pests come into  
contact with the pesticide, and die. These pesticides  
15 have an effective life of approximately 3 months.  
However, their effectiveness can be markedly reduced if  
the surface is washed or becomes damp, removing the  
pesticide. Because of the nature of spraying the pesti-  
cide onto the surface, a uniform distribution of pesti-  
20 cide cannot be assured, and so a relatively high  
toxicity level must be used to ensure effectiveness.  
Even then, areas of the surface may be missed, allowing  
the pests to pass through a target zone without coming  
into contact with the pesticide.

25 The second method is to employ pest strips  
which contain a vaporizing pesticide which must  
diffuse throughout the area to be protected. Again, as  
the pesticide must be effective throughout the whole  
area, fairly high toxicity levels must be used. As the  
30 pesticide must be able to vaporized, it is generally  
unstable, and means must be provided to control the  
breakdown of the pesticide or the effective life of the  
strip would only be from a few hours to e.g. 7 to 10  
days..

For example, Australian Patent Specification



12.

No. 431,714 (Herculite Protective Fabrics Corporation) discloses a pesticidal strip where a pesticidal impregnated sheet is enclosed in a non-porous container which allows a controlled migration of the pesticide to the surface of the container. The Specification states it is essential to use this form of encapsulation as the pesticides are subject to rapid breakdown (or decomposition) at 100°F (about 38°C), and gives examples of pesticides which have effective lives in open atmosphere of approximately 7 to 10 days but which may be effective for up to 90 days using the encapsulation method. Should the container be damaged, the pesticides would rapidly lose their effectiveness, and the user would be exposed to very high toxicity levels with detrimental health effects. The pesticides employed rely on their vaporizing characteristics, and leave little, if any, residue.

#### SUMMARY OF THE PRESENT INVENTION

It is an object of the present invention to provide a sheet, container or the like, hereinafter referred to as an item, which is provided with the pesticide to protect the item from pest attack and/or to protect at or adjacent a target zone to kill pests which come in contact with the item.

It is a preferred object to provide a pesticidal item where the protection against pests is available at much lower toxicity levels than for conventional methods.

It is a further preferred object to provide a pesticidal item which has a long effective life.

It is a still further preferred object to provide a pesticidal item which can be easily and economically manufactured.

Other preferred objects of the present invention will become apparent from the following

description.

In one aspect the present invention provides a method of proofing an item against crawling insects, the method including the steps of:

5           dispersing a pesticide in a solvent, said solvent comprising a water- or alcohol-based printer's ink/solvent mixture (or milled ink) and said pesticide comprising a wettable-powder or liquid dispersable in the solvent;

10           applying the pesticide dispersion to the item by a printing method; and

          drying the applied dispersion to remove the volatile solvent constituent and to leave the pesticide on the item to be contacted by the crawling insects.

15           DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

          In one preferred embodiment, the pesticide is applied to the surface of the item by printing the pesticide dispersion onto the item using a flexopress, 20           offset press or letterpress technique. Alternatively, the pesticide may be applied by silk screening methods.

          The pesticide is preferably a residual contact pesticide, retained on the material of the item as a residue of fine crystals, uniform in size and distributed uniformly over the material of the item. It may 25           actually be soluble in a suitable common solvent for the pesticide and the ink. A preferred pesticide for use with the flexopress, offset or letterpress methods of printing is that sold under the Trade Mark "WP80" by 30           Bayer AG. Another preferred pesticide is "PROPOXUR" (2-isopropoxy-phenyl-N-methyl-carbamate) developed by Bayer AG and the subject of U.S. Patent No. 3,111,539 assigned to Bayer. Other commercially available residual contact pesticides may be used for all the 35           embodiments, and these include carbamates (such as



bendicarb), chlorinated hydrocarbons, organic phosphates (such as idophenphos, fenitrochion or DURSBAN [RTM]), and pyrethroids (including synthetic pyrethroids).

5           The pesticide dispersion is printed directly onto the item to proof the item against crawling insect attack. However, in addition the dispersion may first be applied to items - in the form of sheets, laminae or the like - which are then placed in a target zone to  
10       protect the target zone from the crawling insects. The dispersion may, for example, be applied directly to legal or archival documents, or to the containers for same, to prevent the insects from destroying the valuable documents.

15           Suitable sheets or laminae include paper or paper-like materials, papiermaché, thin felt, cloth, plastics materials or other similar liquid-absorbent materials. One particularly suitable as the sheets or  
20       laminae is newsprint, which is highly absorbent.

25           Preferably, the sheets or laminae can be readily cut to size and shape to enable them to be fitted to a surface, and the sheets or laminae may be provided with an adhesive backing to enable them to be fixed to the surface. The sheets or laminae may also be  
30       provided with a waterproof membrane to enable them to break down in soil to leave a pesticidal barrier in the soil.

          It is possible to formulate the dispersion such that the printed items are odourless and non-  
35       staining. It is also possible to choose a pesticide the toxicity level of which in or on the items is lower than for conventional methods for using contact pesticides - indeed, the toxicity level may be up to 60% lower, making the items safer to handle by humans.

          The invention naturally extends to an item



manufactured by the above method.

To enable the invention to be fully understood, a number of preferred embodiments will now be described.

5           Wetttable residual pesticide powder sold under the Trade Mark "WP80" (80% strength) by Bayer AG is mixed in a water-based printer's ink in the ratio of approximately 30%:70% by weight. The resultant dispersion is printed onto a sheet by conventional offset  
10           printing methods, and then dried to leave pesticidal-bearing ink on the sheet, the pesticide being in the form of fine crystals substantially uniformly distributed through the ink.

          For offset and letterpress printing, the  
15           dispersion may contain up to approximately 30% pesticide, high concentration being usable for flexopress printing.

          Depending on the thickness and material of the sheet, it may be bound e.g. to a book, typed or printed  
20           on as a legal document, or formed into a container e.g. a cardboard box. Alternatively, the sheet may be cut to size and shape, and placed under a kitchen sink, bathroom vanity unit and/or laundry tub unit.

          Tests have shown that if a cockroach is  
25           exposed to the pesticide for 2 minutes, it is incapacitated in 45 minutes and dead in less than an hour. The effective life of the pesticide, particularly when used in the printing of a book, may be many years. In this way, the invention may be used to provide protection for  
30           legal and archival material at very low cost. The documents may themselves be printed with the ink pesticidal dispersion or contained in boxes or cartons so printed or in containers supplied with replaceable pesticidal sheets.

35           As cockroaches forage at night, the effective-



ness of the sheets may be further increased by using paper sheet having a "furry" surface which increases the effective surface area of the sheet with which the cockroaches can come into contact.

5 The sheet may be semi-rigid and supplied in the form of mats or pads, depending on the intended application. The mats or pads may be applied to the floors of ships' holds, or may be provided as a lining for shipping containers, suitable adhesives being  
10 applied to one side of the mats or pads to hold them in place. The sheets may also be placed in pets' kennels to kill fleas or ticks.

To protect young trees, when planting, against termites, the holes for the trees may be lined with  
15 papiermaché impregnated or printed with pesticides. The tree is planted and the hole is filled in. The papiermaché breaks down, leaving the pesticide as a residual barrier around the roots of the tree.

To provide a termite barrier for concrete slab  
20 or pile house foundations, a waterproof membrane backing (similar to "Ferticon") is applied to the impregnated or printed "paper" sheet. The sheet breaks down, leaving an evenly distributed pesticide residue under the concrete slab or around the concrete piles.

25 As the pesticidal sheets are odourless, non-staining and have a very low toxicity level, they can be easily handled by humans, and for domestic applications the sheets can be cut from a roll or mat as required. The sheets are contact killers which are  
30 highly effective and can be easily removed, replaced and stored, with an estimated unlimited shelf and an effective life of e.g. 12 to 18 months.

As can be readily seen, the sheets are safe  
to humans and pets, yet deadly for pests, a claim which  
35 few, if any, currently available pesticides or pest





strips can make.

It will be readily apparent to the skilled addressee that the choice of sheets or laminae, pesticidal materials and potential applications is almost unlimited, and so various changes and modifications may be made to the embodiments described without departing from the scope of the present invention defined in the appended Claims.

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CLAIMS

1. A method of proofing an item against crawling insects, the method including the steps of:

dispersing a pesticide in a solvent, said solvent comprising a water- or alcohol-based printer's ink or ink/solvent mixture, and said pesticide comprising a wettable powder or liquid pesticide dispersible in the solvent;

applying the pesticide dispersion to the surface of the item by a printing method; and

drying the dispersion to remove the volatile solvent constituents and to leave the pesticide on the item to be contacted by the crawling insects.

2. A method as claimed in Claim 1, in which the pesticide is a residual contact pesticide retained in or on the material of the item as a residue of fine crystals.

3. A method as claimed in either of the preceding claims, in which a flexopress, offset press or letterpress technique is used to apply the pesticide dispersion to the item.

4. A method as claimed in any of the preceding claims, in which the pesticide is one or more carbamate, chlorinated hydrocarbon, organic phosphate, or natural or synthetic pyrethroid.

5. A method as claimed in Claim 4, in which the pesticide is one or more of bendicarb, idenophos and fenitrochion.

6. A method as claimed in any of the preceding claims, in which the item is a sheet or laminae of paper, newsprint, papiermaché, thick felt cloth or plastics material.

7. A method as claimed in any of the preceding claims and substantially as hereinbefore described.

8. An item whenever insect-proofed by a method as claimed in any of the preceding claims.

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9. A method of proofing a surface or area against crawling insects, the method including the step of placing on or near the surface, or in or near the area, an insect-proofed item as claimed in Claim 8.

10. A surface or area whenever proofed by a method as claimed in Claim 9.

